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SILVER HAKE

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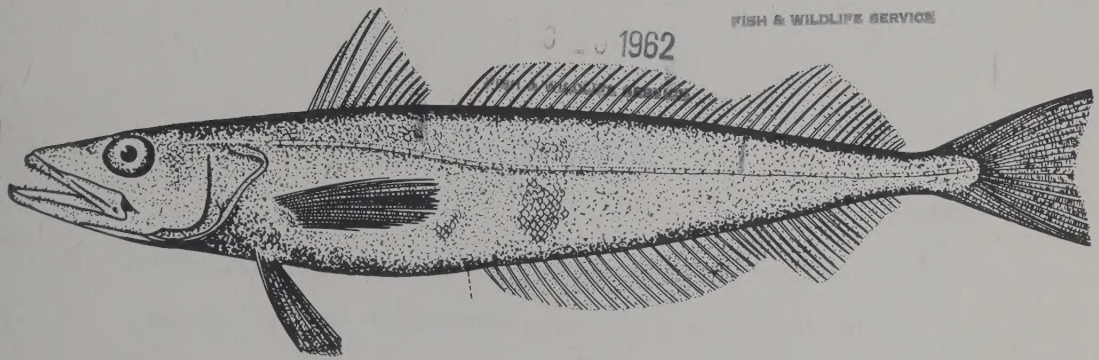

by Raymond L. Fritz

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Washington, D. C.
May 1962

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SILVER HAKE

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The silver hake or whiting *(Merluccius bilinearis)* is one of the few fishes that are used for a variety of products. Some fish, such as haddock and cod, are used chiefly for human food and some, such as menhaden, are used chiefly for reduction to oil and meal, but the silver hake is used for human food, for reduction, and for animal food. It is one of the most abundant fishes of our Atlantic coast, and, because of the many uses to which it can be put, the silver hake is fished for by a large and varied fleet. In 1959, this species ranked third in total pounds landed along the Atlantic coast with a catch of 115 million pounds, valued at $2.3 million.

This is a slender, soft-rayed fish with a streamlined body and well-developed teeth. The absence of a chin whisker on the lower jaw is a good superficial characteristic to distinguish the silver hake from such species as the red hake and the white hake. The fins are transparent; the upper fins and tail are edged with black and the lower fins with white. The upper part of its body, extending to just below the lateral line, is gray mottled with brown. The lower part of its body is silvery iridescent; thus accounting for its common name. Shortly after it dies, the fish becomes more silvery in color and the upper part of the body changes to a brownish-black color.

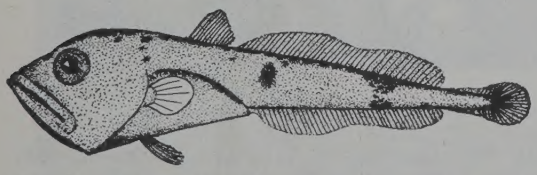


Figure 1.--A young silver hake one-half of an inch in length.

There are 10 hakes of the genus *Merluccius*, including the silver hake, found in many parts of the world. Other hake species occur off the coast of Chile, England, South Africa, and the west coast of the United States. The Pacific hake *(Merluccius productus)* is found from Southern California to Northwestern Alaska. Although generally abundant, it is discarded at this time by most of the local fishermen and not utilized to any extent except for animal food. There are two species along the Atlantic coast of the United States; the silver hake is the more important commercial species, while the American hake *(Merluccius albidus)*, which dwells in greater depths (600 feet or more), is seldom caught by fishermen.

Distribution and Movements

Silver hake are largely bottom dwellers inhabiting the Continental Shelf waters of eastern North America from Newfoundland to North Carolina. Thus, we see that this species is capable of adapting itself to warm waters of the south and to cold waters of the north. The largest concentration of these fish is located off the New England coast. During the summer, the silver hake is numerous in the inshore waters from the shore out to depths of approximately 300 feet. As winter approaches, the fish gradually move to deeper waters, frequently seeking depths of 600 feet or more. They

Figure 2.--Tagging silver hake at sea.

usually remain in this deep water until spring, and then migrate toward shoal water. This seasonal movement, inshore in the spring and offshore in the winter, also coincides with spawning, which takes place during the summer.

Spawning

The spawning season of the silver hake is generally between June and September, with the heaviest spawning in July and August. Silver hake eggs have been found in both inshore and offshore waters, from Cape Cod to the Bay of Fundy. The eggs are buoyant, transparent, and small, about 1/32-inch diameter. A newly hatched fish is about 1/8 inch long and drifts along with the ocean surface currents. We do not know how long the small fish spend drifting about, but we have caught little silver hake, approximately 1 inch in length, on or near the bottom toward the end of the first summer.

Tagging

In order to find out where silver hake go during their lifetime, biologists of the Bureau of Commercial Fisheries have tagged and released many hundreds of fish. The tag is a piece of bright yellow, plastic tubing, aptly called a "spaghetti" tag, attached through the back muscle of the fish. A reward message and serial number are printed on each tag. The results to date show that most of the tagged silver hake were recaptured near where they were originally tagged. A few fish, however, were caught as far as 40 miles away.

Growth

The age of silver hake is determined by counting the number of rings in the otoliths, or ear bones, found in the head of the fish. The otolith of the silver hake is an irregular pear-shaped structure that varies in size depending on the length of the fish. There are usually three pairs of otoliths, but only one pair is large enough to use.

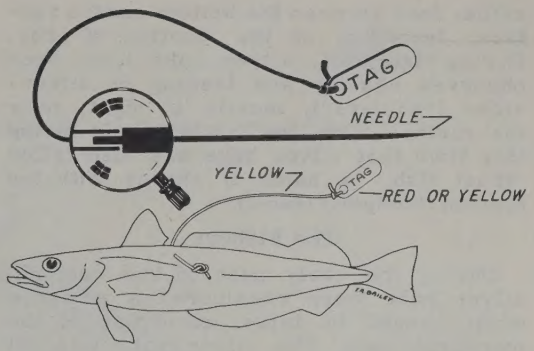


Figure 3.--A silver hake with tag attached.

The growth rings can be seen by placing an otolith in glycerin against a dark background and examining it under a low power microscope. The spring and summer growth appears as a white band or ring, while the fall and winter growth appears as a dark band or ring. Present information indicates that silver hake grow fairly rapidly for the first 3 years and more slowly thereafter. The males usually attain a maximum length of approximately 15 inches, whereas the females grow even larger. The largest females caught measure about 2 feet in length and weigh approximately 5 pounds. In general, the bulk of the silver hake landed in the commercial catch are fish about 12 inches in length and about one-half pound in weight.

Feeding

Silver hake are strong, swift swimmers and at times voracious feeders. They prey largely on shrimp and small fishes, but occasionally a crab or squid will be on the menu. Silver hake are not classed as bottom feeders, such as the haddock or cod, but

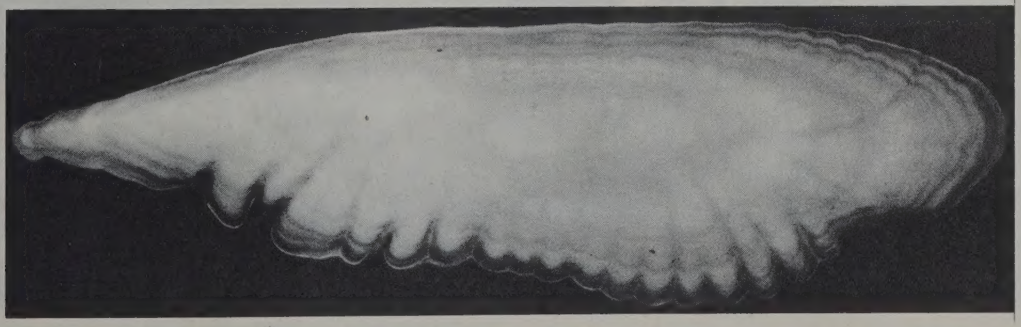


Figure 4.--A typical silver hake otolith.

rather feed between the bottom and the surface, depending on the location of prey. During late fall, silver hake have been observed chasing and feeding on silversides ("shiners"), mostly at night, near the surface along the beaches. It is during this time that silver hake are also called "frost fish," a name it shares with the tomcod *(Microgadus tomcod)*.

The Fishery

During the early part of this century, silver hake were considered a nuisance when caught in large quantities in the mackerel nets. The silver hake was not considered a food fish at that time because it spoiled readily. There was an abundance of other, more valuable species, also. Limited amounts were landed and shipped to fried-fish shops in and around St. Louis, Missouri, during the middle 1920's. An active fishery did not begin until the 1930's.

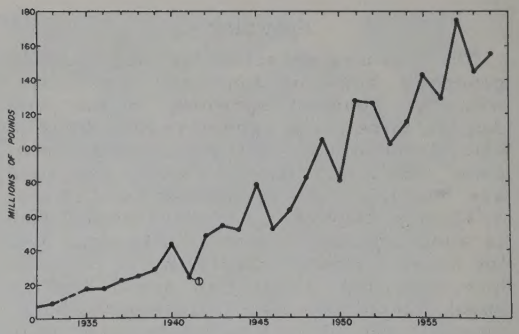


Figure 5.--Annual New England landings of silver hake, 1932-59. (One 1941 figure is for Boston, Gloucester, and Portland only.)

Silver hake were used only for human food at first, but, as time went on, markets were developed for animal food and for industrial use.

Figure 6.--A small New England dragger.

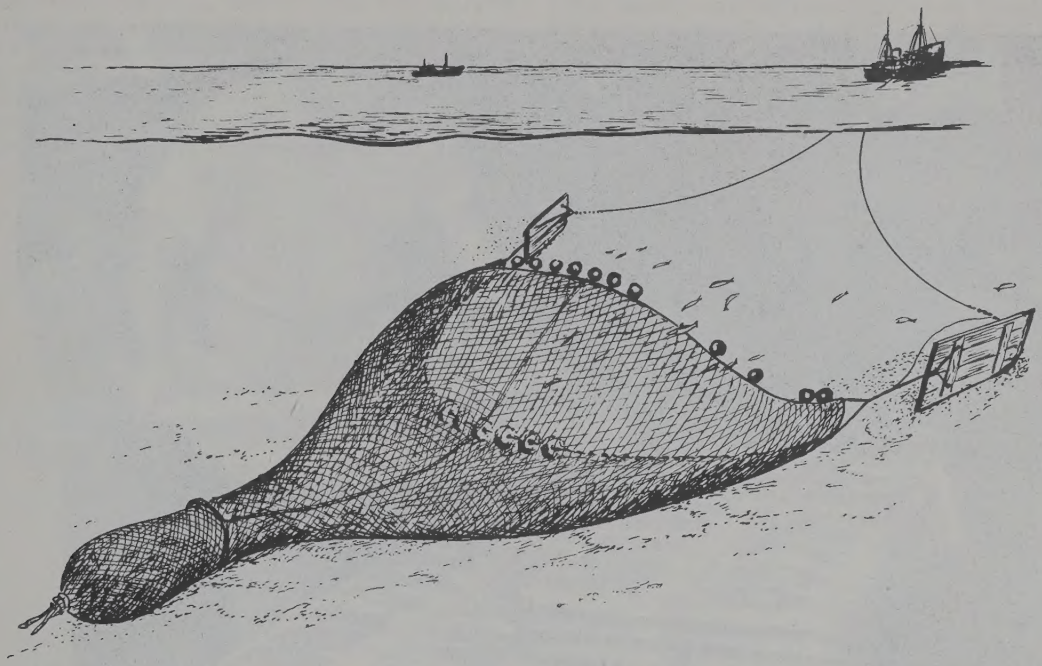
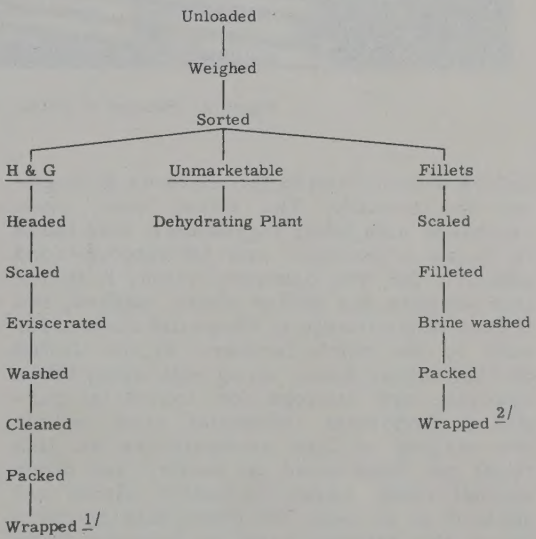


Figure 7.--An otter trawl used in commercial fishing.

Silver hake are usually taken commercially during daylight hours along the inshore waters from Maine to New Jersey and offshore on Georges Bank. The fishing fleet consists mostly of small draggers from 35 to 50 feet long and a few larger vessels up to 90 feet long. Silver hake are also caught with pound nets, but the greatest quantities are landed by the draggers which tow a large cone of netting, called an otter trawl, along the ocean bottom.

Silver hake are also caught by sports fishermen with rod and reel. Along the New England coast, the silver hake move into the bays and harbors in the fall in search of small bait fish. It is at this time that the sportsmen make good catches of this species at night off the local docks and piers. Along the Middle Atlantic coast, party boats are also used during the spring months to catch silver hake, cod, and ling (red hake) a few miles offshore.

The freshly caught fish are iced at sea and landed at the ports usually whole, but in some cases with the heads and entrails removed. The fish destined for human food are unloaded onto conveyors that lead to automatic scaling, washing, and heading machines. The final preparation of the fish is done by workers who trim and load the packages by hand. The packages are then machine wrapped, put on trays, and frozen



1/ 1-1/2 pound overwrapped, 5 and 10 pound packages.
2/ 1 pound overwrapped.

Figure 8.--Diagram showing the general steps of processing silver hake.

Figure 9.--Packages of whiting or silver hake before quick freezing.

before distribution to the markets throughout the country. The silver hake, when combined with other ingredients, was found to be an economical and satisfactory food additive for the domestic mink. Fish for this purpose are landed whole, washed, and frozen immediately in 50-pound cartons for sale to the mink farmers in the United States. Silver hake, along with many other species, are utilized for industrial purposes. Important industrial uses include the making of fish concentrates for fish meal or flour used in poultry and other animal food. Large reduction plants are located in or near the major fishing ports along the Atlantic coast to process these species.

In the last 10 years, technological developments in handling, processing and analyzing fishery products from the time caught until delivered has advanced rapidly.

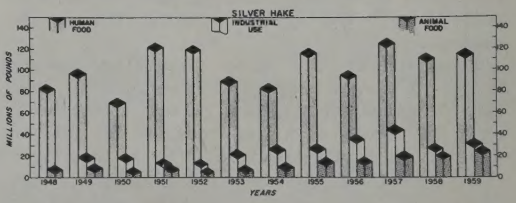


Figure 10.--Landings of silver hake for human food, industrial use, and animal food.

No longer are fishery products sold commercially without some technological research and quality control standards to aid the industry and public. Biochemical tests made at the Technological Laboratories of the Bureau of Commercial Fisheries in Boston and Gloucester, Massachusetts, have included detail analyses of the protein,

moisture, fat, ash, amino acid, sodium, and potassium composition of the silver hake, as well as the affects of holding time on quality when the fish are either quick frozen, held in ice, or stored in refrigerated sea water. These tests are a continuing part of the overall fishery research effort.

Reference

If you wish to know more about the silver hake, additional information can be found in "Fishes of the Gulf of Maine," written by Henry B. Bigelow and William C. Schroeder. This was published as a Fishery Bulletin, volume 53, in 1953, by the Fish and Wildlife Service of the United States Department of the Interior. Copies may be borrowed through your local library.

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